

## What is Claimed is:

1. An isolated and purified polynucleotide comprising Sequence ID No. 6

2. The isolated and purified polynucleotide of claim 1, where said polynucleotide is a

5 cyanobacterial nucleic acid fragments encoding a herbicide resistant AHAS large subunit gene.

3. A nucleic acid fragment of claim 1 where the said cyanobacteria is *Synechocystis* PCC 6803.

4. An isolated and purified polynucleotide comprising Sequence ID No. 17

10 5. The isolated and purified polynucleotide of claim 4, where said polynucleotide is a cyanobacterial nucleic acid fragments encoding a herbicide resistant AHAS small subunit gene.

6. A nucleic acid fragment of claim 4 where the said cyanobacteria is *Synechocystis* PCC 6803.

15 7. A method for target site gene identification in cyanobacteria, said method, the successful development of various protocols for High-Through-Put molecular manipulation of *Synechocystis*, comprising

(1) lead compound identification,

(2) generation and selection of resistant mutant,

20 (3) Isolation of genomic DNA from resistant cell lines.

(4) Primer design and PCR amplification of gene fragments from *Synechocystis*

(5) High Through Put genetic transformation and target site gene identification

8. An isolated and purified polynucleotide comprising Sequence ID No. 3

9. The isolated and purified polynucleotide of claim 8, where said polynucleotide is a

25 cyanobacterial nucleic acid fragments encoding a herbicide resistant mutant pds gene.

10. A nucleic acid fragment of claim 1 where the said cyanobacteria is *Synechocystis* PCC 6803.